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MICHAEL J. SANTORELLI

Rationalizing the Municipal Broadband Debate

Abstract: If one were to believe some of the hyperbole surrounding the many discussions on universal broadband access, one would be dismayed by how far the United States seems to have fallen behind its international counterparts in the race to build out networks. Indeed, by some accounts, the United States is on the brink of economic ruin if it continues without a coherent strategy to rectify the situation. Under these circumstances what is the United States to do? Local municipalities have sought to fill this apparent broadband void by building networks to compete, in some form or another, with incumbent broadband providers in order to speed network build-out and drive down prices. Contrary to this belief, many feel that the broadband market is healthy and robust. These competing perceptions constitute the crux of the current municipal broadband debate. This article seeks to clarify the debate by offering a valuable framework within which future disputes and misunderstandings might be avoided or current ones resolved. In order to accomplish this, the article will show that the market is in fact healthy and competition is robust. The article will then examine a number of municipal entrance strategies and derive from each a number of observations on what has and has not been successful to date. This article will conclude by enumerating a set of guiding principles for use by policymakers and regulators at all levels of government to consider before deciding whether it is prudent for a municipality to enter the broadband market. The general conclusion will be that municipal entry is appropriate only under a very limited number of circumstances.

Author: Associate Director, Advanced Communications Law & Policy Institute, New York Law School. The author would like to thank Charles Davidson and Beth Noveck for their continued support. The opinions expressed herein are solely the author's.

I. INTRODUCTION

Broadband, a high-speed, "always on" connection to the Internet, continues to fuel a number of policy discussions on all levels of government. President George W. Bush has identified universal access to broadband as vital to America's continued economic prosperity.[1] Others have labeled broadband the "dial-tone" of our time[2] and a "civil right."[3] Yet, while there is little dispute that broadband and broadband-enabled technologies represent the future of communication, a number of Chicken Littles have been trying to convince us that the sky is falling.

If one were to believe some of the hyperbole surrounding the broadband debate, one would be dismayed by how far the United States seems to have fallen behind its international counterparts in the race to build out broadband networks. While some label the situation a "problem,"[4] others have called it a "battle,"[5] and a "war."[6] Some of the supporting evidence used to back up these assertions is equally effective in producing anxiety and dread. Among other reasons why the current technological situation "sucks:"[7] "$1 trillion might be lost over the next decade due to present constraints on broadband development;"[8] countries like South Korea and Japan appear to be

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[1] *See, e.g.*, MSNBC Staff and News Service Reports, *Bush Calls for Universal Broadband by 2007*, MSNBC, Mar. 26, 2004, http://www.msnbc.msn.com/id/4609864/.

[2] *See* Marguerite Reardon, *Can Wi-Fi Make It in Manhattan?*, CNET NEWS, Dec. 12, 2005, http://news.com.com/Can+Wi-Fi+make+it+in+Manhattan/2100-7351_3-5992316.html (a description attributed to Andrew Rasiej).

[3] *See Competition in the Telecommunication Industry: Hearing Before the S. Comm. on Commerce, Science, and Transp.*, 108th Cong. 2 (2003), (statement of Michael J. Copps, Comm'r, Fed. Comm. Comm'n), *available at* http://commerce.senate.gov/hearings/testimony.cfm?id=719&wit_id=1944 (last visited Oct. 30, 2006).

[4] *See* CHARLES FERGUSON, THE BROADBAND PROBLEM: ANATOMY OF A MARKET FAILURE 5 (2004).

[5] *See* MARTIN FRANSMAN, *Introduction* to GLOBAL BROADBAND BATTLES: WHY THE U.S. AND EUROPE LAG WHILE ASIA LEADS (Fransman ed., 2006).

[6] *See* Jim Hu & Marguerite Reardon, *Cities Brace for a Broadband War*, CNET NEWS, May 2, 2005, http://news.com.com/Cities+brace+for+broadband+war/2009-1034_3-5680305.html.

[7] *See* Lawrence Lessig, *Why Your Broadband Sucks*, WIRED, Mar. 2005, *available at* http://www.wired.com/wired/archive/13.03/view/html?pg=5 (last visited Oct. 30, 2006).

[8] *See* Thomas Bleha, *Down to the Wire*, 84 FOREIGN AFF. 111 (2005).

distancing themselves from the United States in terms of deployment and penetration rates;[9] and, our nation's prior advantage in maximizing the effectiveness of information technology[10] has, according to some, been all but erased, which portends long-term economic consequences.[11] Under these circumstances, what is the United States to do?

Local municipalities have sought to fill the apparent void. Municipal involvement in broadband deployment has evolved from a rarely used policy initiative into an apparent solution to the broadband problem.[12] Cities small and large have begun to explore the possibility of building networks to compete, in some form or another, with incumbent broadband providers. Despite the fact that there have been only a few success stories,[13] municipal involvement in broadband deployment is still being heralded as the savior of the broadband market.[14] Contrary to this belief, many feel that the broadband market is healthy. With a little nudge [15] from policymakers, especially the

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[9] *Id.; see also* ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD), OECD BROADBAND STATISTICS (2005), *available at* http://www.oecd.org/document/16/0,2340,en_2649_34225_35526608_1_1_1_1,00.html#Graphs2005. It should be noted, however, that most Asian markets are drastically different, both in terms of regulations and consumer demand, than the U.S. broadband market. For one, regulatory policies in these countries mandate open access to networks by all competitors. *See, e.g.*, Philip Weiser & Thomas Bleha, *Which Broadband Nation?*, 84 FOREIGN AFF. 514 (2005).

[10] It is a well-accepted maxim that the U.S.'s prosperity of the 1990s was directly attributable to the adoption of efficient information technologies. *See, e.g.*, MARTIN WOLF, WHY GLOBALIZATION WORKS 120 (2004).

[11] *See* FERGUSON, *supra* note 4, at 7.

[12] The number of municipalities offering some kind of communications service has nearly tripled over the last five years. *See* Sharon E. Gillett, *Municipal Wireless Broadband: Hype or Harbinger?*, 79 S. CAL. L. REV. 561, 565 (2006).

[13] Indeed, there are only "three . . . U.S. cities that are providing services at scale to the public without the involvement of a preexisting electric utility or a private sector partner." *Id.* at 574. Each of these three cities has populations of less than 52,000, and two are remote from urban areas. *Id.*

[14] *See, e.g.*, FERGUSON, *supra* note 4, at 5 ("Local broadband deployment is now the most critical driver both for improvement in conventional voice telecommunications services and for the future progress of data communications and the Internet.").

[15] *See* Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Services, 545 U.S. 967 (2005) (upholding the FCC's conclusion that "cable companies that sell broadband Internet service do not provide a 'telecommunications service' as the Communications Act defines that term, and hence are exempt from mandatory common carrier regulation under Title II."); *see also*

Federal Communications Commission ("FCC"), the market continues to be highly efficient, characterized by robust competition and rapid technological innovation. This is the crux of the current municipal broadband debate.

The parties to the debate – incumbent service providers on the one hand and municipalities on the other – are vociferous opponents with very different interests in and expectations for the market. Unfortunately, the debate is often skewed by the many accusations levied and lawsuits filed by both parties.[16] This article seeks to clarify the debate by offering a valuable framework within which further disputes might be avoided or current ones resolved. However, in order to do this, a thorough analysis of some fundamental principles must be undertaken.

Part II of this article will provide a more thorough understanding of broadband and the market for it. Broadband is currently more of an amorphous idea than a clear approximation of how fast a connection ought to be. But, rather than settle on one specific number, it will be more prudent to appreciate the rudiments of a broadband connection and focus on the growing number of broadband-enabled applications that consumers currently demand. Such a focus will help us understand why the broadband market, in its current iteration, is poised to be the more efficient vehicle for connecting users to the Internet. An analysis of the evolution of the broadband market, especially the rise of intermodal competition between older technologies like dial-up access, current technologies like cable and DSL, and new technologies like Wi-Fi and WiMAX, will further demonstrate that the market is innovative, robust, and responsive to consumer demand.

Part III will focus on the various ways in which municipalities have gotten involved in broadband deployment and analyze the effectiveness of each strategy. First, a local government might build its own proprietary network and designate itself the service provider. While this is by far the minority approach, it is one that has been met with relatively positive results. Similarly, a municipality might contract for the construction of a network wholly for governmental purposes. Public safety and intra-government networks put the municipality in the role of a purchaser of broadband, thereby putting

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Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, 17 F.C.C.R 3019-20 (2002) ("[W]e tentatively conclude that providers of wireline broadband Internet access service offer more than a transparent transmission path to end-users and offer enhanced capabilities. Thus, we tentatively conclude that this service is properly classified as an 'information service' under section 3 of the [Communications] Act.").

[16] *See infra* for examples.

the government into the "private" side of the equation. Second, there are a growing number of states that prohibit municipal entrance into the broadband market with legislation. This has been done in about a dozen states around the country and has been met with sharp criticism.[17] As will be seen, an outright prohibition is usually not prudent because there might be situations where municipal involvement is necessary. Finally, an attractive compromise between the two extremes is a public-private partnership whereby a municipality exchanges monopoly rights over public rights-of-way for certain service guarantees from a private service provider. This quid pro quo has been the popular approach of late, mostly because it shifts the risk from the public entity to the private one.[18]

Part IV will build upon the conclusions of Parts II and III and set forth guiding principles that should be used when deciding whether a local market needs municipal broadband. "Market failure" is often used to describe the only situation where a municipality can enter the market.[19] But the term, while apposite in this context, is often left undefined. The guiding principles will set forth a number of criteria, along with more general policy considerations, to establish a set of indicators for policy makers, regulators, and other market stakeholders to use when deciding if it is appropriate for a public entity to enter the broadband market. The guiding principles will include ways to define the relevant local market, methods for analyzing supply of and demand for broadband, a workable definition of market failure, and strategies for those municipalities that meet the criteria for market entry. Ultimately, it will be shown that, except in rare cases, a municipality will not be the most efficient entity to provide broadband access to residents.

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[17] Barriers to municipal entry, like state-level prohibitions, in combination with the perception that the United States is not on the right course towards universal broadband deployment, usually inspire very sharp reactions. *See, e.g.*, Michael J. Copps, *America's Internet Disconnect*, WASH. POST, Nov. 8, 2006.

[18] *See, e.g., Editorial: A Wi-Fi Winner*, PHIL. INQUIRER, Oct. 12, 2005.

[19] *See, e.g.*, Community Broadband Act of 2005, S. 1294, 109th Cong. (2005), 151 CONG. REC. S7299 (daily ed. June 23, 2005) (floor statement of Sen. John McCain, in support of the Community Broadband Act of 2005), http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?dbname=2005_record&page=S7299&position=all.

II. UNDERSTANDING THE BROADBAND MARKET

Hitherto, those who favor unfettered municipal involvement in broadband have sought to bolster their position by arguing that the United States is in dire need of a revitalized broadband policy.[20] However, these assertions often miss the forest for the trees because they omit the effects that robust competition has had on the broadband market.[21] This section will offer a broad view of both broadband and its market in order to parse the competitive evolution of the vital new technology.

First, a workable definition of broadband will be set forth. This will aid in understanding the fundamentals of the underlying technology and in appreciating the growing need for faster connections. Consumer demand has shifted over the years, away from wanting basic services like email and towards advanced applications like VoIP and streaming media. These services require huge amounts of bandwidth in order to be delivered cleanly. As demand increases, new delivery technologies, faster speeds, and lower prices are greeting consumers. The market, then, is in the best position to establish how fast connections ought to be; market analysis will be a more accurate reflection of consumer demand.

The discussion will then turn to an overview of the market and analyze the wide variety of ways broadband can and will be delivered. The analysis will be put in a historical perspective, beginning with the advent of Internet connection via dial-up modems and progressing forward through the introduction of DSL and cable modem services. While these two latter technologies are currently very popular, a number of new competitors are entering the market. Wireless technologies like WiMAX and 3G cellular networks hold much long-term promise while land-based technologies like fiber-optic cables appear to be more viable short-term competitors. In the end, it will become clear that the broadband market is packed with a diverse array of firms that are vigorously competing for customers.

A. DEFINING BROADBAND

Connection speed and bandwidth are crucial to understanding the evolution of the broadband market. As will be shown below, dial-up

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[20] *See* Lessig, *supra* note 7.

[21] Telecommunications policymaking is grounded in the study of the market. *See* Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69, 80 (2004).

connections to the Internet have lost popularity at an exponential rate because the increase in the number and type of advanced services available over the Internet, like video and VoIP, have driven demand for more speed and more capacity. Thus, many argue, speeds over 1 MB/s are the bare minimum that the next-generation systems must deliver in order to provide users with the tools necessary to be productive members of the digital economy. [22] Setting a specific performance metric for broadband, however, has been difficult.

Most people will be hard pressed to explain the Internet connection speed they consider broadband. Many would probably say that anything faster than dial-up should be deemed "broadband." Dial-up modems, the first mass-market gateway to the Internet, topped out at 56 kB/s, or 56,000 bytes per second. For some perspective on how slow dial-up Internet access is, consider the fact that the bandwidth associated with an average DSL connection is around 3 MB/s, or 3 million bytes per second, which is over fifty times as fast as a dial-up connection. Similarly, the speed of cable modems is usually between 4 to 5 MB/s. In addition, the FCC has taken a more measured approach to broadband by defining broadband as anything over 200 kB/s.[23] The figure, however, has been met with criticism for being too conservative a benchmark.[24] Yet, as consumer demand for faster Internet connections continues to increase, the need for a clear set of benchmarks appear unnecessary.

A simple Google search of definitions for broadband yields more than twenty-five different results.[25] The definitions range from

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[22] It has been suggested that VoIP needs, at minimum, a 90 kB/s connection. Streaming video requires anywhere from 1 MB/s to 6 MB/s. Standard television requires at least 4 MB/s while high-definition (HD) television requires 20 MB/s. *See* Wikipedia, Broadband Internet Access, http://en.wikipedia.org/wiki/Broadband_Internet_access (last visited Oct. 30, 2006).

[23] *See* Third Report, Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, 17 F.C.C.R. 2844, ¶¶ 7, 9 (2002).

[24] For example, TechNet, a group of high tech industry CEOs, has issued a statement that places "true broadband at 100 megabits per second (Mbps) . . . Broadband is high-speed, interactive, always on, two-way communications provided by cable modems, telephone lines...wireless, and fiber [optic lines]. . . Broadband is more appropriately defined as a connection platform, a gateway to information and services." *See* MATTHEW D. BENNETT, ALLIANCE FOR PUBLIC TECHNOLOGY & BENTON FOUNDATION, A BROADBAND WORLD: THE PROMISE OF ADVANCED SERVICES 7 (2003), http://www.apt.org/publications/reports-studies/broadband-world.pdf.

[25] The Google search was conducted by typing "define: broadband" into the search field.

descriptive definitions like "a data transmission technique allowing multiple simultaneous signals to share the bandwidth of a single physical cable"[26] to more performance-oriented definitions such as "in Integrated Services Digital Networks (ISDN), broadband channels support rates above the primary rate (1.544 Mbps or 2.048 Mbps)."[27] Indeed, performance metrics range from the FCC's 200 kB/s to 1.544 MB/s to as high as 100 MB/s.[28] Setting a minimum speed requirement for broadband is dangerous for two reasons. First, outlining a strict definition risks setting the bar too low. For example, while many might agree that the FCC's standard is adequate, some firms, in order to brand their service as "broadband," might provide only the bare minimum of 200 kB/s. Such minimal provision would dilute the market and make it difficult for consumers to choose among broadband providers. Second, a metric imposed by statute, either on the state or federal level, or via a policy statement issued by the FCC or a state regulatory commission, is too rigid and inflexible to keep up with the rapid technological changes associated with the current broadband market. While most consumers today will likely be satisfied with connection speeds of several MB/s, broadband video is poised to become the next "killer app."[29] Clear streaming video requires a bit more bandwidth than is currently available.[30] Thus, it becomes apparent that consumer demand and not regulatory fiat is the best way to approximate acceptable levels of broadband speeds. As the demand for more speed increases, so too will the need for more diverse methods of supply.

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[26] *See* Tribal Justice Information Sharing System, www.tjiss.net/glossary_b.html (last visited Oct. 30, 2006).

[27] *See* Oregon Health and Science University, *Videoconferencing Services – Glossary of terms,* http://www.ohsu.edu/vcs/glossary/#b (last visited Jan. 5, 2007).

[28] *See* BENNETT, *supra* note 24.

[29] *See, e.g.,* CHRIS ANDERSON, THE LONG TAIL (Hyperion 2006).

[30] For an introduction to the technology underlying broadband-enabled IPTV, see Nate Anderson, *An Introduction to IPTV,* ArsTechnica.com, Mar. 12, 2006, http://arstechnica.com/guides/other/iptv.ars.

B. THE RISE OF INTERMODAL COMPETITION IN THE BROADBAND MARKET

Although the Internet is many decades old,[31] residential access to it became widely available only in the early 1990s.[32] However, in the past decade, residential and business usage has risen exponentially. As users became more proficient at navigating the web and merging Internet technologies into their personal and professional lives, demand for more expert applications increased dramatically. The need for basic services like sending and receiving emails was quickly replaced by the desire for more advanced communication services like synching PDAs or replacing a landline telephone with a VoIP system. In addition, talking in chat rooms was quickly displaced by text messaging, which has since been replaced by large-scale social networking sites and the ability to share personal videos on the Internet. While consumer demand drove application makers to develop these products, their dissemination hinged on the availability of high-speed and high-capacity connections that would be able to deliver them without any degradation in quality. Thus the concept of "broadband" arose.

The story of heightened demand for advanced applications due to the growth of a large pool of savvy Internet users runs parallel to the rise in intermodal competition among broadband delivery methods. Early Internet Service Providers ("ISPs") like America Online ("AOL") led the field in providing primary gateways to the online world and the World Wide Web, a graphical user interface that allowed the average user to "surf the web" easily.[33] ISPs like AOL served as the middleman between a user and the Internet. In a nutshell,[34] AOL would place a telephone call through one's computer

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[31] The Internet was initially a government-funded network that originally sought to make defense information systems redundant and then sought to connect university researchers with each other. For a more in-depth history of the Internet's development, see KATIE HAFNER & MATTHEW LYON, WHERE WIZARDS STAY UP LATE (1996).

[32] AOL is often credited as the first company to offer mass-market dial-up Internet access. AOL 1.0 for Windows was launched in 1993. Wikipedia, AOL, http://en.wikipedia.org/wiki/AOL (last visited Oct. 30, 2006).

[33] The World Wide Web was developed by Tim Berners-Lee in 1989. TIM BERNERS-LEE, WEAVING THE WEB: THE ORIGINAL DESIGN AND ULTIMATE DESTINY OF THE WORLD WIDE WEB BY ITS INVENTOR 21 (1999).

[34] *See* Wikipedia, Dial-up, http://en.wikipedia.org/wiki/Dial-up (for a brief but good introduction to dial-up Internet access).

modem to the local telephone company. Like with all modem telephone calls, the telephone company would dedicate that telephone line for Internet use. The main function performed by dial-up ISPs was converting an analog telephone call, placed by the user through his modem, into an Internet connection. But, unfortunately for ISPs like AOL, their business models and underlying technology were not capable of meeting this demand, as copper wires and telephone calls can only provide so much bandwidth. A vacuum began to appear between the availability of broadband-enabled applications and broadband connections.

1. THE SHIFT TO DIGITAL

One of the first incarnations of the broadband connection was via digital subscriber line ("DSL") technology. This technology sought to connect a user directly to the digital infrastructure rather than having to go through the analog bottleneck associated with the ISPs. One might wonder why the telephone companies, whose lines were being used for dial-up Internet access, did not seize on the increased demand for higher speeds and roll out DSL service immediately. There are a number of reasons for this, but the primary one was the absence of a "critical mass" of demand from Internet users for higher speeds or the presence of a competitor in the Internet access market.[35] As will be explained below, the emergence of cable companies in the ISP market quickly forced telephone companies to roll out DSL.

The technology underlying DSL is rather straightforward. It uses the existing copper wiring in the telephone network and employs technology that segregates the different frequencies associated with voice (analog) and data content (digital). This digital content is read at the local carrier's central facility and allowed to bypass the normal telephone switch on its way to the Internet.[36] Speeds for a DSL connection can range as high as 3 MB/s,[37] but there are a few drawbacks to this delivery method.

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[35] *See* JONATHAN E. NUECHTERLAIN & PHILIP J. WEISER, DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICYMAKING IN THE INTERNET AGE 136 (2005).

[36] For more information on DSL, see Wikipedia, Digital Subscriber Line, http://en.wikipedia.org/wiki/Digital_Subscriber_Line (last visited Oct. 30, 2006); DSL Forum, http://www.dslforum.org/ (last visited Oct. 30, 2006); Tutorial-Reports.com, Broadband, http://www.tutorial-reports.com/networking/broadband/ (last visited Oct. 30, 2006).

[37] For example, in New York City, Verizon is the dominant incumbent DSL service provider. *See, e.g.*, REPORT: TELECOMMUNICATIONS AND ECONOMIC DEVELOPMENT IN NEW YORK CITY 17 (2005). For its various service plans and packages, see Verizon, Packages & Prices,

First, the infrastructure it relies on for delivery, the copper wiring of the telephone network, is old and often incapable of offering speeds over 3 or 4 MB/s.[38] Similarly, a second drawback relates to physical access to these lines. The speed of one's connection varies inversely with the distance one is from the local telephone company's central office. Even though DSL is a dedicated line (it is, after all, a telephone line), speeds decrease the further one is from the central office. On average, the ceiling for such is around 18,000 feet.[39] There have been a number of recent advances in DSL technology, but there is a finite amount of innovation possible on such antiquated wiring.[40] This has spurred telephone companies to upgrade their networks replacing the copper wires with fiber-optic ones.

2. BROADBAND VIA CABLE MODEM

Cable companies began to offer broadband over their lines because the underlying technology of their networks made it relatively easy to do so. Cable providers are able to send both cable television and broadband signals over the same wire – a coaxial cable – by splitting the two into separate frequencies, which are then converted on the consumer's end by a set-top cable box and a cable modem.[41] However, like the copper wires of DSL, there are drawbacks associated with cable delivery.

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http://www22.verizon.com/ForHomeDSL/channels/dsl/packages/default.asp (last visited Oct. 30, 2006).

[38] There have been a number of recent technological innovations that have increased DSL speeds. *See infra* note 40 for an explanation.

[39] *See, e.g.*, Broadband Reports.com, About DSL: Distance, http://www.dslreports.com/information/kb/distance (last visited Oct. 30, 2006).

[40] The most common type of DSL is asymmetric DSL ("ADSL"). This means that there is a difference between upstream and downstream speeds. In other words, speeds favor downloading items onto your computer over uploading things onto the Internet. Recent DSL developments include SDSL, or symmetric DSL, which provides equal upstream and downstream speeds; and VDSL, or very-high-bit-rate DSL, which promises downstream speeds over 50 MB/s and upstream speeds over 10 MB/s. This technology, along with a newer version, VDSL2, require multiple copper wires to achieve these speeds, which makes this technology prohibitively expensive to install. DSL Forum, Learning About DSL: Glossary, http://www.dslforum.org/learndsl/glossary.shtml (last visited Oct. 30, 2006).

[41] *See* Wikipedia, Coaxial Cable, http://en.wikipedia.org/wiki/Coaxial_cable (last visited Oct. 30, 2006).

The main drawback is that, like copper wires, there is a limit to the bandwidth that coaxial cable can deliver. Secondly, unlike telephone and DSL technologies, there are no dedicated cable lines. Rather, because traditional cable "broadcasting" consisted of transmitting the same signal to all its customers, cable companies relied on networks of shared lines. This means that cable broadband service can slow down with an increase in the number of users on an immediate network.

Unlike incumbent telephone companies, however, cable companies had already upgraded most of their networks with fiber-optic cables. This was not due to increased customer demand so much as it was due to the arrival of an intermodal competitor for cable content. In the late 1980s and early 1990s, direct broadcast satellite ("DBS") entered the market as an alternative to cable television.[42] Initially, DBS was allowed to enter the television market with little regulation. However, as it became more and more popular, Congress responded by passing the Satellite Home Viewer Improvement Act of 1999,[43] which created a statutory copyright license that allowed DBS companies to carry the signals of local broadcasting television stations without obtaining authorization from the holders of the individual copyrights.[44] This piece of legislation, along with a number of FCC regulations, sought to even the playing field between DBS and cable in order to maximize competition. The rollout of new fiber-optic networks by cable companies was evidence that these regulations succeeded in spurring competition, which in turn spurred innovation,[45] which continues today.

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[42] The FCC, though, first considered DBS in 1982. Application of Satellite Television Corp. for Authorization to Construct an Experimental DBS System, 91 F.C.C.2d 953 (1982).

[43] The Satellite Home Viewer Improvement Act of 1999, Pub. L. No. 106-113, 113 Stat. 1501A-523 (1999). *See also* Satellite Television Act of 1999, S. Rep. No. 106-51 (1999), *available at* http://www.congress.gov/cgi-bin/cpquery/R?cp106:FLD010:@1(sr051) ("The purpose of the bill is to amend the Communications Act of 1934 to promote competition in the provision of multichannel video service while protecting the availability of free, local over-the-air television.").

[44] Satellite Broad. & Communications Ass'n v. FCC, 275 F.3d 337, 338 (4th Cir. 2001) (upholding the SHVIA against First Amendment challenges).

[45] *See* James Speta, *Deregulating Telecommunications in Internet Time*, 61 WASH. & LEE L. REV. 1063, 1089-91 (2004).

3. UNWIRING BROADBAND

Over the past several years, wireless broadband technologies have become a very popular tool in which private businesses, like Starbucks, and cities, like Philadelphia, have invested.[46] Wi-Fi, the most popular of this new crop of intermodal competitors, has become especially popular because it is cheap and the underlying technology allows for an easy rollout to a wide service area. Alternatively, WiMAX is currently in its final developmental stages and potentially could deliver Wi-Fi convenience at greater speeds and over greater distances. In addition, third- and fourth-generation ("3G" and "4G") cellular networks are currently being built to deliver data, voice, and video content.

a. WI-FI

Wi-Fi refers to a set of product compatibility standards for wireless local area networks ("LANs").[47] The 802.11 standard, which was established by the Institute of Electrical and Electronics Engineers ("IEEE"),[48] refers to a class of different frequencies over which data can be transmitted wirelessly. Signals travel on either the 2.4 GHz or 5 GHz range of the radio spectrum, depending on which standard is being used. The FCC does not regulate these swaths of spectrum; indeed, Wi-Fi operates on what has been called "the garbage bands" of the spectrum.[49] Such regulatory abstention has led to product innovation and fast rollout of "hot spots," areas where wireless connectivity to the Internet is available. Wi-Fi's popularity has also spawned a new wireless product industry that is very competitive and diverse, with older hardware companies like Cisco branching out into

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[46] According to December 2005 study by JiWire, there are approximately 32,350 "hot spots" in the United States. A "hot spot" is defined as a place where a user can access the Internet wirelessly (i.e., via a Wi-Fi network). JiWire, http://www.jiwire.com/.

[47] *See* Wikipedia, Wi-Fi, http://en.wikipedia.org/wiki/Wi-fi (last visited Oct. 30, 2006).

[48] *See* IEEE, www.ieee.org (last visited Oct. 30, 2006).

[49] *See A Brief History of Wi-Fi*, ECONOMIST, June 10, 2004.

this market,[50] and newer companies, like Tropos, profiting solely from it.[51]

Wi-Fi, however, has a number of limitations. The main disadvantage is its limited broadcast range. Because of the spectrum it uses, data sent and received over it can travel only up to 300 feet. This severely limits the size of "hot spots" and connection speeds. Though some predict connection speeds of up to 54 MB/s,[52] the reality of multiple, overlapping wireless networks, prevalent in some dense urban areas, may lead to interference among competing signals. Where there are clear channels, heavy traffic often slows performance. Further, while the absence of a license requirement has encouraged market entry by a number of providers, the absence also means that any number of other technologies may (and do) share these bands.[53] Moreover, Wi-Fi technologies are extremely power-hungry, which decreases the convenience of using a laptop in a park or coffee shop, where power outlets are scarce.[54] Finally, there are security concerns associated with any wireless network including an increased exposure to viruses and, potentially, a decrease in privacy.[55]

Notwithstanding these limitations, Wi-Fi's momentum has not waned. On the contrary, many municipalities around the country have set out to build citywide wireless networks.[56] The cornucopia of issues

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[50] *See* Marguerite Reardon, *Cisco Enters Citywide Wireless Market*, CNET NEWS, Nov. 15, 2005, http://news.com.com/Cisco+enters+citywide+wireless+market/2100-7351_3-5952090.html.

[51] *See* Tropos Networks, www.tropos.com (last visited Oct. 30, 2006).

[52] *See, e.g.*, Wi-Fi Alliance, http://www.wi-fi.org/OpenSection/index.asp (last visited Oct. 30, 2006).

[53] For instance, the Wi-Fi standards that use the 2.4 GHz band of spectrum must share with the likes of Bluetooth, microwave oven, and some cordless phones. *A Brief History of Wi-Fi, supra* note 41. This sharing often leads to interference and eventually slower connection speeds. *Id.*

[54] *Id.*

[55] *See, e.g.*, Rob Kelley, *Man Charged with Wireless Network Trespassing*, CNN MONEY, July 7, 2005, http://money.cnn.com/2005/07/07/technology/personaltech/wireless_arrest/, *but cf.*, Jennifer Granick, *Don't Let Fear Kill Muni Wi-Fi*, WIRED NEWS, Oct. 12, 2005, http://www.wired.com/news/politics/0,1283,69175,00.html.

[56] Philadelphia and San Francisco are two of the large cities in the United States to announce wireless projects. *See* Municipal Broadband and Wireless Projects Map, News.com, http://news.com.com/Municipal+broadband+and+wireless+projects+map/2009-1034_3-

associated with the municipal broadband debate will be set forth below, but it should be noted that if broadband is the end goal, Wi-Fi is likely not the best solution in the immediate short-term. Wi-Fi connection speeds are low and prone to frustrating slow downs. However, other wireless technologies are currently in the process of being developed to compete not only with Wi-Fi, but also directly with telephone and cable companies for broadband customers.

b. WiMAX

WiMAX is a certification mark for products that pass conformity and interoperability tests for the IEEE 802.16 standards.[57] In essence, WiMAX is Wi-Fi over a greater distance and with a greater capacity.[58] It is designed to coexist with Wi-Fi and act mostly as a booster to that system.[59] Optimistic appraisals of theoretical ranges for WiMAX are given in miles, not feet, but, estimates have yet to be proven.[60] In fact, some tests decrease WiMAX range to around 5 miles at speeds as low as 2 MB/s.[61]

In addition, WiMAX has been marred by intra-industry uncertainty. There are currently no WiMAX products on the market as companies continue to haggle over standard-setting, which has yet to be finalized.[62] Until this happens, products will not be interoperable, and establishing large, effective networks will be difficult, if not impossible. There is also some regulatory uncertainty as various WiMAX providers have used both licensed and unlicensed spectrum to deliver content. Whether or not the FCC will continue to license

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5690287.html (for more information on how cities of all sizes are entering the broadband market).

[57] For more information, see Wikipedia, WiMAX, http://en.wikipedia.org/wiki/Wi-max (last visited Oct. 30, 2006).

[58] WiMAX has been referred to as Wi-Fi's "big brother." *Wi-Fi's Big Brother*, ECONOMIST, Mar. 13, 2004.

[59] *See, e.g.*, Wikipedia, WiMAX, *supra* note 57.

[60] *See, e.g.*, WiMAX Forum, FAQs, http://www.wimaxforum.org/technology/faq/ (for more information).

[61] *See* Andrew Orlowski, *AT&T Lifts Kimono on WiMAX Trials*, THE REGISTER, Oct. 27, 2005, http://www.theregister.co.uk/2005/10/27/wimax_world_att_trial/.

[62] *See World Domination Postponed*, ECONOMIST, Jan. 29, 2005, at 62.

spectrum for this use or relegate it to the "garbage bands" remains to be seen. However, as the shift to digital television transmission continues, and as more slivers of spectrum become available, there is a possibility that the older swaths used for over-the-air television broadcast might be reallocated for broadband transmission,[63] either via WiMAX or over an advanced cellular network.

c. CELLULAR 3G & 4G NETWORKS

Cellular telephone companies are also actively upgrading existing networks to compete with traditional broadband providers. The move from original cellular networks to second generation ("2G") networks represented a huge step forward as cellular companies upgraded from analog to digital.[64] These new digital networks, however, could only handle digital voice transmission and could not accommodate the demand for more advanced cell services that accompanied the dot-com boom. Users wanted email, text messaging, and other capabilities that would have overwhelmed the 2G networks. This led to a flurry of spectrum buying[65] and mergers[66] as cell phone companies raced to upgrade their networks and acquire as many customers as possible.

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[63] The deadline for transition from analog to digital transmission has been extended to 2009. Stephen Labaton, *Senate Passes Bill to Convert to Digital TV*, N.Y. TIMES, Dec. 22, 2005, at C9.

[64] *See* Wikipedia, 2G, http://en.wikipedia.org/wiki/2G (last visited Oct. 30, 2006).

[65] *See Pass the Painkillers*, ECONOMIST, May 5, 2001, at 51.

[66] In the summer of 2005, Sprint and Nextel merged in order to expand their networks and make it easier to move toward 3G. SprintNextel, Merger Announcement: Sprint Nextel Announces Preliminary Stock and Cash Consideration for Nextel Common Stock, http://sprintnextel.mergerannouncement.com/ (last visited Oct. 30, 2006); *see also* FCC Office of General Counsel, Transaction Team, Cingular/AT&T Wireless, http://www.fcc.gov/transaction/cingular-att_wireless.html (last visited Oct. 30, 2006) (FCC's website dedicated to this merger). Also, in 2004, Cingular Wireless, a joint venture between BellSouth and SBC (two "Baby Bells"), acquired AT&T Wireless, a move that meant, "[c]ustomers of the new company will have access to the largest GSM network in the United States. GSM is the world's most widely used wireless technology with nearly one billion customers in more than 200 nations." Press Release, Cingular, AT&T Wireless Merger, Cingular to Acquire AT&T Wireless, Create Nation's Premier Carrier, *available at* http://media.corporate-ir.net/media_files/irol/12/125269/cingularpressfebruary.pdf; *see also* FCC Office of General Counsel, Transaction Team, Sprint-Nextel FCC Docket No. 05-63, http://www.fcc.gov/transaction/sprint-nextel.html (last visited Oct. 30, 2006) (the FCC's website dedicated to this merger).

3G and 4G networks represent another giant leap forward in data capabilities for cellular companies. These new networks provide increased capacity to transmit large amounts of data at faster speeds. Although there existed ample consumer demand driving these upgrades, cell companies also stood to profit by offering more services like text messaging, email access, and streaming video.[67] Upgrades continue for most U.S. cell companies and new applications and hardware continue to follow this trend. For instance, features like short message services (or "SMS," the mobile equivalent to text messaging), and email access have become extremely popular and are now available as a standard element of almost every cell phone plan offering. Some companies, in an effort to differentiate themselves, have begun to offer streaming video and video clips of television shows and movies on their phones.[68]

From a regulatory standpoint, however, problems are beginning to appear on the once limitless horizon. First, like the other wireless technologies being used to deliver broadband services, cellular companies face a muddled regulatory scheme for allocating spectrum. As cell phones continue to become a primary competitor with traditional landline telephones,[69] a debate rages over how to apportion spectrum efficiently.[70] Striking the right balance is critical to fostering robust competition as too much regulation of 3G and 4G spectrum

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[67] Indeed, it has been posited that the cellular market had saturated and revenues stalled around regular phone calls. In order to stir the market and increase profits, cell companies began to offer more digital amenities. *Vision, Meet Reality*, ECONOMIST, Sept. 2, 2004, at 63.

[68] *See* Marguerite Reardon, *FAQ: The Lowdown on Mobile TV*, CNET NEWS, Oct. 21, 2005, http://news.com.com/FAQ+The+lowdown+on+mobile+TV/2100-1039_3-5905677.html?tag=nl.

[69] *See* FCC, 10TH ANNUAL REPORT AND ANALYSIS OF COMPETITIVE MARKET CONDITIONS WITH RESPECT TO COMMERCIAL MOBILE SERVICES 2, 4 (2005), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-173A1.pdf (this report states that that "97 percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service," and that there are approximately 185 million cell phone subscriptions in the U.S.) [hereinafter FCC Report]; *see also* Mobile Pipeline Staff, *30% of Homes to be Cellular or VoIP-Only: Gartner*, INFO. WK, Nov. 29, 2005, www.informationweek.com/story/showArticle.jhtml?articleID=174402446.

[70] Some call for more flexibility in allocation, i.e., that more spectrum should be made freely available. *See, e.g.*, Yochai Benkler, *Some Economics of Wireless Communications*, 16 HARV. J. L. & TECH. 25 (2002). Others have called for allocation governed by capital market forces, i.e., some channels will be more attractive to certain firms and its price should reflect the demand. *See, e.g.*, Ronald Coase, *Why Not Use the Pricing System in the Broadcast Industry?*, THE FREEMAN 52-57 (July 1961).

might unduly raise barriers of entry for a competing firm.[71] Similarly, there has been uncertainty within the industry over adopting a universal standard for next-generation networks.[72] Similar to the uncertainty over a WiMAX standard, the absence of an industry-wide set of protocols will limit interoperability of devices and could lead to inefficient market segmentation.[73] Yet as 3G and 4G networks, and all wireless broadband technologies, continue to develop, additional intermodal broadband competitors seem poised to enter the market for voice, data, and video services.

4. NEW WIRELINE COMPETITION

Despite the regulatory flux that currently characterizes the wireless broadband industry, unwiring broadband remains a popular choice by companies, cities, and consumers. It is cheap, often unregulated and represents a relatively efficient way for companies to quickly enter the digital marketplace. What one gains in entry speed, though, one loses in connection speed. Because a signal traveling through the air normally encounters many obstacles, the probability of interference and slow-downs within a network is high. Thus, while the speeds available for most wireless services today might qualify as broadband, they remain on the lower end of the scale. Wires connected directly to the end user (over the "last mile") are usually the best method to achieve true high broadband speeds. Cable and DSL are the traditional incumbents in the wireline market. There are, however, two new entrants that might be able to disrupt the incumbents.

a. BROADBAND OVER POWER LINES

As its name implies, Broadband over Power Lines ("BPL"), seeks to deliver broadband over the existing power grid. This is similar to a telephone company using its copper wires for DSL service, except the

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[71] FCC Report, *supra* note 69, at 68.

[72] There are many standards, but the two primary ones are CDMA2000 and W-CDMA. *See, e.g.*, Eric Sylvers, *The Battle of the Standards*, INT'L HERALD TRIB., Nov. 12, 2006, http://www.iht.com/articles/2006/11/12/business/wireless13.php.

[73] Ben Charny, *The 3G Handset Quandary*, CNET NEWS, July 22, 2005, http://news.com.com/The+3G+handset+quandary/2100-1034_3-5800380.html; *see also* John Borland, *Battle Over Wireless Standards Heats Up*, CNET NEWS, Jan. 22, 1999, http://news.com.com/Battle+over+wireless+standards+heats+up/2100-1033_3-220541.html?tag=nl.

power grid is much more reliable and resilient than the phone network. The grid also has the potential for delivering much higher capacity than DSL or cable and promises symmetrical connection speeds[74] that do not slow down based on distance from a central facility or due to a large number of simultaneous users.[75]

The underlying technology that enables BPL has been around for many years. Essentially, electrical signals carrying data run on a different frequency than those carrying electricity. This allows a power company to easily separate signals and pass them over the same lines concurrently. The ubiquity of power grids across the country gives BPL a much larger network than both cable and DSL. Indeed, regulators have consciously avoided regulations that might impede the study and deployment of BPL as this technology potentially has the most promise of fulfilling the goal of universal access to broadband.[76] The primary concern with BPL, though, is getting a clean signal into a user's home. This refers to the fact that the delivery method of signals over power lines is "noisy." The high-voltage signals on which data is sent vibrates in a way that may create significant interference that decreases speed and clarity.[77] The potential for interference with other radio signals in the area also increases.[78] New methods[79] have been

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[74] This means that upload and download speeds are the same. *See* Wikipedia, Symmetrical Connection, http://en.wikipedia.org/wiki/Symmetrical_Connection (last visited Oct. 31, 2006).

[75] *See Plugging In, At Last*, ECONOMIST, Dec. 2, 2004.

[76] *See* FCC, REPORT AND ORDER, IN THE MATTER OF AMENDMENT OF PART 15 REGARDING NEW REQUIREMENTS AND MEASUREMENT GUIDELINES FOR ACCESS BROADBAND OVER POWER LINE SYSTEMS: CARRIER CURRENT SYSTEMS, INCLUDING BROADBAND OVER POWER LINE SYSTEMS, FCC 04-245 (2004), *available at* http://www.naic.edu/~phil/rfi/fccactions/BroadBandOverPwrLines_requirements.pdf.

[77] *See* Robert Valdes, *How Broadband Over Powerlines Works*, HOWSTUFFWORKS, http://computer.howstuffworks.com/bpl3.htm (last visited Oct. 30, 2006) ("Hundreds of thousands of volts of electricity don't vibrate at a consistent frequency. That amount of power jumps all over the spectrum. As it spikes and hums along, it creates all kinds of interference. If it spikes at a frequency that is the same as the RF ["radio frequency"] used to transmit data, then it will cancel out that signal and the data transmission will be dropped or damaged en route.").

[78] Many of the most vociferous opponents to BPL are amateur radio operators who complain that their transmissions suffer due to the interference created by BPL. *See, e.g.*, AMERICAN RADIO RELAY LEAGUE, BPL: WHY AMATEUR RADIO IS CONCERNED ABOUT ITS DEPLOYMENT (2005), *available at* http://www.arrl.org/tis/info/HTML/plc/BPL-leave-behind.pdf.

[79] There are two primary methods: "One is to route around the step-down transformer (i.e., the point where the power from the grid enters a home or office) using wireless technology. The transformer is often on a utility pole outside the customer's premises, so it need only be a short

devised to address these problems, but, even so, speeds seem to top out at around 3 MB/s.[80]

b. FIBER TO THE HOME

Fiber-optic cable represents a major wireline upgrade that has the potential to drastically alter the common perception of broadband.[81] Despite the fact that fiber-optic cable is not new,[82] inventive uses are still being found for it, the most relevant of which is its ability to transfer very large quantities of data over long distances with minimal degradation in quality.

The promise of fiber was first seen in the 1980s when phone companies offered businesses access to high-capacity fiber "rings" for long distance calls and data transfer. The dot-com boom of the 1990s brought about enormous investment in fiber optics, leading many companies to install millions of miles of fiber cables in the hope that they would be used to carry the million-dollar Internet applications being developed in Silicon Valley. However, when the bubble burst, the vast majority of these lines remained unlit, resulting in a situation now referred to as a "fiber glut."[83] Irrational dot-com exuberance aside, two mistakes are often associated with this fiber glut. First, too

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hop to a wireless receiver indoors. The other approach routes the data signal around the transformer and then feeds it back into the domestic electricity supply. A special modem plugged into an electrical outlet then deciphers the signal. This approach also allows domestic electrical wiring to double as a home network." *Plugging In*, *supra* note 75.

[80] There is some evidence that speeds could be as high as 200 MB/s. *See, e.g.*, Wikipedia, Power Line Communication, http://en.wikipedia.org/wiki/Broadband_over_power_lines (last visited Oct. 30, 2006). Current offerings, though, are much slower, due perhaps to the fact that BPL is still in its infancy. For instance, Current Communications, one of the largest BPL providers in the U.S., offers customers symmetrical 3 MB/s service. *See* Current, Current Broadband, http://www.currentgroup.com/solutions/services.html (last visited Oct. 30, 2006).

[81] *See* ROBERT W. CRANDALL, COMPETITION AND CHAOS: U.S. TELECOMMUNICATIONS SINCE THE 1996 TELECOM ACT 130 (2005).

[82] Using fiber-optics for communications stretches as far back as the 1960s. JEFF HECHT, CITY OF LIGHT: THE STORY OF FIBER OPTICS (1999). Use became widespread once prices dropped. In the early 1980s, phone companies began to install fiber optic cable "rings" in areas where there was heavy phone and long distance usage, particularly in urban business districts. NUECHTERLAIN & WEISER, *supra* note 35, at 36-38.

[83] *See* Joanna Glasner, *Bandwidth Glut Lives On*, WIRED NEWS, Sept. 30, 2004, http://www.wired.com/news/business/0,1367,65121,00.html (a description of how cheaply this "dark" fiber is being sold: "Prices have declined despite overall internet traffic more than doubling worldwide between the middle of [2003] and [2004].").

many redundant networks were laid, which resulted in hundreds of million of dollars being spent on duplicate cabling. Redundant networks are inefficient and challenge even the most liberal cost-recovery model. Second, companies failed to invest in last-mile fiber, which meant that the line going from a user's home to his Internet provider's backbone more often than not was coaxial cable or copper wiring, not fiber. It is in this "golden" area upon which a renewed fiber push is focused.

Currently, fiber-optics is at the center of the battle to offer customers the vaunted "triple play" of voice, data, and video. For example, within the past year, a number of incumbent telephone companies have announced initiatives to build Fiber to the Home ("FTTH") networks. Verizon began the trend by announcing plans for its new FiOS system. It will be offered in a handful of areas around the country for the immediate future with the goal being FTTH for all Verizon customers within the next decade.[84] In addition, AT&T is also experimenting with an upgraded fiber network and a hybrid broadband system.[85]

C. CONCLUSIONS

The rise of intermodal competition has had a number of effects on the broadband market in the United States. First, the United States continues to connect users to the Internet via broadband at a healthy rate. In 2004, broadband subscriptions increased by 34% to 37.9 million lines.[86] In the third quarter of fiscal year 2005, the twenty largest cable and DSL providers in the United States, which represent 94% of the market, acquired 2.6 million net additional subscribers,

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[84] *See* Verizon, All About FiOS, http://www22.verizon.com/FiOSForHome/channels/FiOS/root/about_FiOS.asp (last visited Oct. 30, 2006) (for more information about this Verizon offering); *see also* Ken Belson, *Verizon is Rewiring New York, Block by Block, in a Race for Survival*, N.Y. TIMES, Aug. 14, 2006, at C1.

[85] AT&T's Project Lightspeed, branded U-Verse, is similar to FiOS in that it will provide customers with FTTH. *See* AT&T, AT&T U-Verse Experience, http://att.sbc.com/gen/press-room?pid=5838 (last visited Oct. 30, 2006). In addition, AT&T is offering non-DSL broadband services in select rural areas. Press Release, AT&T, AT&T Launches Rural Satellite Broadband Internet Service (May 24, 2006), http://att.sbc.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=22310.

[86] *See* FCC, DATA ON HIGH-SPEED SERVICES FOR INTERNET ACCESS (2005), *available at* http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0705.pdf.

bringing their subscription base to just over 40 million.[87] Indeed, the United States leads the world in the total number of broadband connections.[88]

Second, intermodal competition has resulted in more diverse service offerings and price competition. The average subscriber to DSL in the United States can expect download speeds of 2 to 5 MB/s. Likewise, the average cable modem connection promises download speeds of 4 to 7 MB/s. Both cost, on average, between $35 and $50 per month,[89] and prices continue to decline.[90]

Third, it appears that, in the near-term, land-based broadband networks will serve as the most reliable and fastest connections for users. Even though wireless technologies like upgraded cellular networks and Wi-Fi continue to be very popular with users, the more advanced communications services like video over broadband demand very high connectivity speeds. Thus far, only land-based networks can promise high connectivity speeds. It remains to be seen whether the next generation wireless networks like 4G and WiMAX can live up to their theoretical promise.

Overall, the "market" for broadband and broadband-enabled services appear healthy and robust. New and innovative services abound while prices continue to fall. The number of broadband customers continue to increase at a healthy pace. Yet, despite the health of the market, the wealth of service offerings, and the strength of intermodal competition, municipalities continue to enter the fray. Part III will set out the various methods by which municipalities enter the broadband market and analyze their efficacy. Ultimately, it will be seen that municipal entry must be done carefully and in a manner that does not interrupt the larger broadband market.

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[87] *See* Press Release, Leichtman Research Group, Over 40 Million Subscribe to Broadband Internet in the U.S. (Nov. 11, 2005), *available at* http://leichtmanresearch.com/press/111405release.html.

[88] *See* OECD, *supra* note 9.

[89] *See* S. DEREK TURNER, BROADBAND REALITY CHECK: THE FCC IGNORES AMERICA'S DIGITAL DIVIDE, REPORT ISSUED BY THE FREE PRESS, CONSUMER'S UNION, AND THE CONSUMER FEDERATION OF AMERICA (2005).

[90] *See* GOVERNMENT ACCOUNTABILITY OFFICE (GAO), REPORT TO CONGRESSIONAL COMMITTEES, TELECOMMUNICATIONS: BROADBAND DEPLOYMENT IS EXTENSIVE THROUGHOUT THE UNITED STATES, BUT IT IS DIFFICULT TO ASSESS THE EXTENT OF DEPLOYMENT GAPS IN RURAL AREAS 5, 37 (2006), *available at* http://www.gao.gov/new.items/d06426.pdf.

III. AN ANALYSIS OF THE METHODS OF MUNICIPAL ENTRY INTO THE BROADBAND MARKET

Currently around 600 municipalities provide broadband in some form or another to their residents.[91] These initiatives account for only a very small percentage of the nearly 25,000 municipalities around the country.[92] Yet, the number of municipalities that are either planning or thinking about such ventures continue to increase exponentially each year. With each new participant comes a unique business model for deploying these systems.

Municipal broadband spans a spectrum of government involvement from total control over municipally built networks to being prohibited by state law from even considering control. These situations, though, are more often the exception rather than the rule as there is a wide middle ground between these two extremes where many of the more interesting models are born. This part will set forth a sampling of some municipal initiatives, assess their pros and cons, and gauge their efficacy, all in an effort to derive valuable lessons that will serve as the foundation for the guiding principles.

A. THE MUNICIPAL EXTREME: BUILDING AND MAINTAINING A NETWORK

Municipal broadband projects built, owned, and maintained by a local government are rare. However, in the few cases where municipal broadband projects have been proposed, they have attracted vehement reactions from incumbent service providers that generally lament the entrance of a municipal competitor as anticompetitive. The municipalities usually counter by saying that their network will compete on the merits and serve only to nudge prices down.[93] Whether any of these arguments are true remains to be seen as many of these types of projects have yet to be fully completed. But judging

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[91] *See* David Tureck, *The Competitive Effects of Municipal Provision of Wireless Broadband*, in NEW MILLENNIUM RESEARCH COUNCIL, NOT IN THE PUBLIC INTEREST – THE MYTH OF MUNICIPAL WI-FI NETWORKS' 20 (2005) *available at* http://newmillenniumresearch.org/archive/wifireport2305.pdf.

[92] *See* Census 2000 U.S. Gazetteer Files, *available at* http://www.census.gov/geo/www/gazetteer/places2k.html (last visited Oct. 10, 2006).

[93] The Lafayette controversy, discussed *infra*, is a good example of how this debate tends to proceed.

from the vitriol of the litigation surrounding them, municipally-owned broadband networks have struck a discordant nerve that is revealing of the larger struggles facing regulators.

Perhaps the most well-known, and notorious, example of this type of project is in Lafayette, Louisiana. In 2004, this city of around 150,000 residents announced its plans to build its own FTTH network in order to provide residents with a faster and cheaper broadband alternative. The network would essentially be an extension of its existing fiber network that serves city agencies and would cost approximately $125 million, an amount that would be funded through the issuance of bonds.[94] Incumbent providers, notably BellSouth, immediately challenged the validity of this type of municipal involvement.[95] In an effort to further legitimize its right and power to go forward with the project, Lafayette put the issue to the residents and, in July of 2005, held a special referendum for the municipal FTTH system. The measure passed by a 2-to-1 margin.[96]

Similar projects include one that is currently under development in Utah. Dubbed UTOPIA ("Utah Telecommunications Open Infrastructure Agency"), this FTTH project seeks to connect fourteen cities to a common and open fiber infrastructure.[97] The openness of the network will allow customers to choose from among competing service providers, who themselves will gain access to the network by purchasing bandwidth at wholesale prices. The nation's largest municipal FTTH project, iProvo, is housed in Provo, Utah. What started initially as a plan to lay fiber for inter-governmental convenience, quickly turned into a pilot program to extend the network to homes and businesses and, after the success of this experiment, has been built out to all 110,000 residents.[98] Provo has also recently

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[94] *See* Chloe Albanesius, *In La., Model Problems for a Broadband Pioneer*, NAT'L J., Aug. 9, 2005, http://www.njtelecomupdate.com/lenya/telco/live/tb-VDWW1123617858885.html.

[95] *See, e.g.*, Leslie Cauley, *Bells Dig In to Dominate High-Speed Internet Realm*, USA TODAY, Jan. 3, 2005, at B1, *available at* http://www.usatoday.com/tech/news/2005-01-03-fiber-cover_x.htm.

[96] *See* Carol Wilson, *Lafayette Voters Overwhelmingly OK Fiber Network*, TELEPHONY ONLINE, July 18, 2005, http://telephonyonline.com/fttp/technology/lafayette_fiber_voters_071805/#.

[97] *See, e.g.*, Drew Clark, *The Quest for a Municipal UTOPIA*, NAT'L J., Aug. 15, 2005, http://www.njtelecomupdate.com/lenya/telco/live/tb-JLQZ1124223622523.html.

[98] *See, e.g.*, Marguerite Reardon, *City-Owned Network Moves Forward*, CNET NEWS, July 16, 2004, http://news.com.com/City-owned+network+moves+forward/2100-1034_3-5272638.html.

contracted with a service provider to supply cable content over the network.

Presently, it is difficult to provide a blanket evaluation of municipally built and owned broadband networks because very few have been completed in densely populated areas or in places that are served by two content providers. There is evidence that the prospect of getting UTOPIA up and running has caused local content providers to respond by decreasing prices.[99] These projects have been challenged not only in the courts but on the policy level as well. Detractors to municipally-owned broadband networks often claim that municipally-owned networks will chill innovation and stifle potential competition. Some also argue that the public sector should not be spending large amounts of taxpayer money because municipalities are not as efficient as the private sector and are less likely to show a healthy return on its investment.[100] But an air of legitimacy surrounds many of these projects because many have been put to voters for approval. Municipalities further justify using taxpayer money as essential to attracting new business and increasing the tax base.[101]

B. THE REGULATORY EXTREME: PREEMPTIVE LEGISLATION AT THE STATE LEVEL

While some local governments continue to take a "wait-and-see" approach to the success of municipal broadband projects, many states have preempted the decision-making process by passing laws that

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[99] *See* Paul Morris, *UTOPIA Means Competition, Choice and Lower Prices*, UTOPIA TEAM EMAIL, Issue 2, (UTOPIA Community MetroNet Newsroom, West Valley City, UT), Aug. 2005, http://utopianet.org/news/teamemail/teamemail_Aug05.htm.

[100] One of the most vociferous opponents to the Lafayette project has been the Heartland Institute. They have issued two reports condemning municipal FTTH projects. The first, released in October 2004, concluded that, "[g]enerally speaking, municipal ownership of broadband networks is probably not in the best interests of residents and most businesses, even in communities not well served today by private providers." Joseph L. Bast, *Municipally-Owned Broadband Networks: A Critical Evaluation*, THE HEARTLAND INSTITUTE 28 (Oct. 2004), http://www.heartland.org/pdf/15842.pdf. The second, released in June 2005, concluded that broadband is not a public utility and efforts by municipalities to build FTTH networks have gone over budget and been poorly maintained. Steven Titch, *Municipal Broadband: Optimistic Plan, Disappointing Reality*, THE HEARTLAND INSTITUTE 14 (June 2005), http://www.heartland.org/pdf/17264.pdf.

[101] *See* Myles Roberts, Note, *Opening the Last Mile to Competition*, 4 VA. SPORTS & ENT. L.J. 309, 327 (2005).

severely restrict or absolutely ban a municipality from building, owning, maintaining, or proposing a network.

After a bit of legal wrangling over interpreting provisions of the Telecommunications Act of 1996 as it pertains to a state's power to legislate against municipal involvement in broadband markets, in 2004 the Supreme Court upheld this power as outside the regulatory purview of the Act.[102] As of the end of 2005, twenty-three states had enacted, or were considering, legislation that addresses the municipal broadband debate.[103] Twelve of those states[104] now have laws that limit future public broadband projects, while permitting existing initiatives to continue operating.[105] Several states have provided for limited authorization of such services,[106] while others require the issue to go before residents as part of a referendum.[107] At the federal level, a number of drafts to rewrite the Telecommunications Act explicitly address this issue. A bill passed by the House of Representatives would explicitly allow for municipal broadband initiatives;[108] a Senate version would also allow for these initiatives.[109]

The tension between legislating against municipal involvement, either on the state or national level, and leaving the option open for a municipality to do so, reflects the overarching debate over reining in

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[102] Nixon v. Mo. Mun. League, 541 U.S. 125 (2004) (the dispute arose over interpreting § 253 of the 1996 Act, which states that no state or local law could "prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service." The Court held that "any entity" does "not include the state's own subdivisions" and therefore does not affect the power of state to restrict a municipality in delivering services.).

[103] *See* MICHAEL J. BALHOFF & ROBERT C. ROWE, BALHOFF & ROWE, LLC, MUNICIPAL BROADBAND: DIGGING BENEATH THE SURFACE 104 (2005), http://www.balhoffrowe.com/pdf/Municipal%20Broadband--Digging%20Beneath%20the%20Surface.pdf.

[104] *Id.* (these states are Arkansas, Florida, Minnesota, Missouri, Nebraska, Nevada, Pennsylvania, South Carolina, Tennessee, Texas, Utah, and Washington.).

[105] *Id.* at 108.

[106] These include Iowa, Maine, Ohio, Pennsylvania, Tennessee, Utah, and Virginia. *Id.* at 109.

[107] These states include Colorado, Florida, Louisiana, Minnesota, Ohio, Tennessee, and Utah. *Id.*

[108] Communications Opportunity, Promotion and Enhancement Act of 2006, H.R. 5252, 109th Cong. (as passed by House, June 8, 2006).

[109] Communications, Consumers' Choice, and Broadband Deployment Act of 2006, S. 2686, 109th Cong. (2006) is currently being marked up and reconciled with the House bill.

local power to regulate telecommunications.[110] Opponents to nationalizing telecommunications policy stress that it might leave some communities behind as incumbent providers offer higher-priced packages and better service to their best customers. On the other hand, supporters of nationalizing telecommunications policy argue that it would make it easier for new competitors to enter the market by allowing them to forego negotiations with individual municipalities before offering services.

C. THE MIDDLE GROUND: PUBLIC-PRIVATE PARTNERSHIPS

The middle ground for most municipal governments has been to contract with a private entity to fund, build, and maintain a municipal network in exchange for access to public rights-of-way. The city of Philadelphia is the flagship of this model.

In September 2005, Philadelphia announced a unique partnership with Earthlink.[111] Earthlink agreed to finance and build a citywide Wi-Fi system in exchange for access to the city's rights-of-way and the ability to recoup expenses by selling access to residents, albeit at a discounted price.[112] This agreement contains three unique yet crucial aspects. First, Earthlink agreed to tier pricing by selling regular access

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[110] In particular, the debate surrounds the idea of local franchising. Cable companies, pursuant to traditional regulation, must secure franchising rights from the city in order to provide service. Municipalities, however, do not have unlimited franchising power. Cable Communications Policy Act of 1984, 47 U.S.C. § 521 *et seq.* (1984) Section 541 specifically limited local government's ability to use the threat of franchise non-renewal as a means by which to discipline cable franchisees. The 1984 Act also capped the franchise fee that local government can charge at 5 percent of the cable system's gross revenues. 47 U.S.C. § 542. A few years later, in response to a rapid surge in cable adoption, and a concomitant rise in price, Congress passed the Cable Television Consumer Protection and Competition Act of 1992, Pub. L. 102-385, 106 Stat. 1460 (2000) [hereinafter 1992 Cable Act]. As it pertains to local franchising, the 1992 Act prohibited local government from granting exclusive franchises and unreasonably refusing to award additional competitive franchises. 47 U.S.C. § 541(a)(1). There was, however, some *quid pro quo*. Both Acts carved out special powers for local governments, including the ability of a municipality to require cable franchisees make available certain channel capacity at no charge for "public, educational, or governmental use," which has come to be known as PEG access. 47 U.S.C. § 533.

[111] Wireless Philadelphia is a nonprofit group that is charged with overseeing the promulgation of wireless technologies throughout the city. For more information, please see the group's website, Wireless Philadelphia, http://www.wirelessphiladelphia.org.

[112] *See, e.g.*, Arshad Mohammed , *Philadelphia to be City of Wireless Web*, WASH. POST, Oct. 5, 2005, at D01, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2005/10/04/AR2005100401738.html.

at $20 per month and dropping prices to $10 per month for low-income families.[113] Second, the Earthlink network will be open for other ISPs to purchase access at wholesale prices.[114] This will theoretically allow for competition among wireless ISPs and potentially serve to further offset the competitive pressures of the incumbent DSL and cable providers. Finally, Earthlink will give a small percentage of their revenues back to the city. These funds will be managed by a nonprofit agency, Philadelphia Wireless, and be reinvested in technology-oriented training programs for children and adults.[115]

Wireless access, however, will top out at 1 MB/s. From a value standpoint, it appears as though this venture is not worthwhile as per MB/s rates range from $10 to $20. But for low-income residents, the targeted beneficiaries of the municipal offering, this is a step in the right direction. Similar projects are currently in development in Chicago, San Francisco, Anaheim, and many other cities around the country.[116]

The public-private partnership model appears to strike a balance between those who want a municipality to get involved in the broadband market and those who want the public sector relegated to the role of a facilitator rather than a contractor. Similarly, it puts the municipality in the familiar role of using its existing assets to work with private sector companies that have a financial stake in the outcome. It would appear that both sides have the potential to profit greatly from a successful municipal endeavor, financially for the private sector and politically for the public sector. There is little evidence yet that this model will work in practice despite its theoretical promise.

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[113] *See* Press Release, Earthlink, Earthlink Selected to Lead Build Out of Wireless Philadelphia, (Oct. 4, 2005), http://www.earthlink.net/about/press/pr_wireless_philly/.

[114] *Id.*

[115] *Id.*

[116] For a complete listing of new wireless RFPs as of January 29, 2006, see Muniwireless, Municipal Wireless Bids in 2005 and 2006: RFPs, RFIs and RFQs status as of 29 January 2006, http://www.muniwireless.com/reports/docs/RFPs2005-2006.rtf. (last visited Oct. 30, 2006).

D. THE MUNICIPALITY AS PURCHASER

A growing number of municipalities across the country are entering the market for broadband services as purchasers of networks for "private" use.[117] A common example of this type of network is one for public safety.

Public safety networks are usually ubiquitous wireless systems installed by private contractors for use by emergency responders like police, fire, and medical services. Currently, there are thirty-five networks built and in use across the United States, with many more under development.[118] Wireless access is a necessity for those in the field who need real-time information like the floor plan for a burning building or to upload critical health data to a hospital in advance of an ambulance's arrival. Municipalities have often employed one of two tactics to establish such a network. Cities like Spokane, Washington have purchased access from a local broadband provider under the condition that the system run separately from the "public" wireless system. This is to prevent the system from buckling from too many users.[119] New York City, on the other hand, is currently in the process of developing a wholly owned, custom-made wireless system for emergency responders. The system is currently in a pilot stage but the goal is to have a citywide wireless system that is interoperable among emergency responders and can support the field operations of a number of governmental agencies.[120] However, as with any wireless technology, there are drawbacks.

Wireless systems are prone to the drawbacks associated with Wi-Fi and WiMAX technologies. In addition, the availability of spectrum capable of supporting the enormous amounts of data to be sent over the networks is scarce. Some municipalities have built wireless networks that use unlicensed spectrum but this swath of frequencies is

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[117] In this context, "private" is used to describe the type of system being purchased, namely a wholly owned governmental network that is closed to the public and for use only by employees.

[118] *See* Muniwireless.com, List of US Cities and Regions, Sept. 10, 2006, http://www.muniwireless.com/reports/docs/Sept-10-2006summary.pdf.

[119] *See* Kim Crompton, *Citywide Wi-Fi Zone Eyed*, J. OF BUS., Apr. 22, 2004, *available at* http://www.spokanejournal.com/spokane_id=article&sub=1952.

[120] *See* Press Release, Government Technology, Mayor Bloomberg Announces Wireless Pilot Program for New York City Police and Fire Departments (June 15, 2006), http://www.govtech.net/magazine/channel_story.php/99883.

already bustling with activity from other wireless signals. For cities like New York City, that are building very large networks, a more reliable swath of spectrum is needed. Some spectrum is currently available for these networks but, on the whole, large portions of it remain under the ownership of television broadcasters. However, more will likely become available as broadcasters transition to all-digital transmissions.[121]

E. CONCLUSIONS

Municipal broadband initiatives continue to increase and diversify each year. There have been some failures and some successes thus far but uncertainty still characterizes the remaining projects. Many will likely look to the larger municipal projects in Philadelphia and Chicago before deciding on the efficacy of the public-private model. In addition, FTTH projects, while expensive and labor-intensive, might hold the most promise. Regardless, a number of practical concerns remain.

The main focus going forward will be whether the investing entity is able to recoup its large upfront investment. Many of the larger municipal projects are based on a fee-for-access model. Very few would promise free access (although some wireless projects in smaller cities do offer free access).[122] Earthlink, a leading municipal wireless company, recently unveiled a citywide wireless network in Anaheim, California. Despite its initial popularity, the company doesn't expect to turn a profit until at least 2009.[123] This type of situation has given rise to a new type of hybrid business model favored by companies like Google, that seek to generate a steady stream of revenue based on targeted, local web-based advertisements. However, would such a

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[121] *See, e.g.*, Grant Gross, *Nextel Founder Wants New Wireless Public Safety Network*, COMPUTER WORLD, Apr. 27, 2006, http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=110948.

[122] *See* Elinor Mills, *Google Details Mountain View Wi-Fi Service*, CNET NEWS, June 21, 2006, http://news.com.com/Google+details+Mountain+View+Wi-Fi+service/2100-7351_3-6086639.html (Google's plans for this free system are not wholly selfless. It plans to use this system as a "test bed" in order to fully understand the technology, and being that Google is located in Mountain View, CA, it would be of benefit to workers at and away from work.).

[123] *See* Marguerite Reardon, *Earthlink Christens its First Citywide Wi-Fi*, CNET NEWS, June 29, 2006, http://news.com.com/EarthLink+christens+its+first+citywide+Wi-Fi/2100-7351_3-6089302.html.

revenue-generating model, predicated on local advertising, pervert the sanctity of municipal broadband? Might a company, acting under the aegis of universal access to broadband, begin to skew its intentions towards entities that represent a higher return on investment?

These and doubtless other questions will continue to linger as more and more municipalities mull over entering the broadband market. But rather than calling for an outright prohibition or a universal green light, a more rational, middle ground is needed.

IV. GUIDING PRINCIPLES FOR MUNICIPAL INVOLVEMENT IN BROADBAND DEPLOYMENT

Stepping back from the fray, some general themes emerge. The public-private partnership appears to be the most efficient business model for a municipality to use if it wishes to enter the broadband market. From an economic standpoint, a municipality avoids having to finance a citywide network with taxpayer money and opens the possibility of turning a profit. But there is little in the way of objectively deciding when it is appropriate for a municipality to get involved.

Municipalities, to date, have operated under the assumption that their involvement in the broadband market was irrebuttable; that, by citing issues like a stagnant marketplace and the existence of a "digital divide," their initiatives would be automatically justified. In addition, some local governments have used a "backdoor" into the broadband market by extending or splitting a wholly owned government network for public use. Regardless of the entry method a municipality might choose, municipalities ought to have a set of guiding principles to be considered in advance of entering the market.

A. ACCURATELY DEFINE THE MARKET

Until now, the municipal broadband debate has focused primarily on the "duopoly" of cable and telephone companies.[124] Yet, as was noted above, the robust broadband market continues to foster intermodal competition among different delivery platforms. Applying traditional antitrust notions to markets characterized by intermodal

[124] The word "duopoly" implies coordinated behavior among the firms in order to let each maintain their market share.

competition has proven hazardous in some situations.[125] But some of the economic underpinnings of antitrust policy are appropriate here.

Proper market definition is essential when assessing competition. This includes identifying relevant competitors and the product being sold or the service being performed. Striking the right balance between over- and under-inclusiveness of firms competing for customers is often a hazard. A good benchmark to consider in this context is that "a market is the arena in which significant substitution in consumption or production occurs."[126] In other words, a market is a group of sellers offering goods that are significantly similar but ultimately substitutable. Thus, while some of the broadband delivery methods outlined above are still in the nascent stages of development and deployment, they represent competitors in the broadband market. Overlooking methods like BPL, Wi-Fi, or WiMAX in favor of focusing on a cable-telephone "duopoly" unnecessarily skews the debate away from promising intermodal competitors and towards the larger, more established firms. The incumbents are easy targets because of their size, their customer bases, and their deep pockets. But a renewed faith in innovation and lower prices is evidence of an acknowledgment of new entrants into the broadband delivery market.

B. ASSESS THE MARKET FROM BOTH A SUPPLY AND DEMAND SIDE

Each local broadband market is unique. Some larger cities might have two or three incumbent providers of cable and DSL while smaller, more rural towns might have only one source for broadband or none at all. Residents in each municipality might generally demand broadband while others might not want it at all. Thus, it is important to proceed on a case-by-case basis when determining whether municipal involvement is warranted.

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[125] *See, e.g.*, Prometheus Radio Project v. FCC, 373 F.3d 372 (3d Cir. 2003). The Court, in striking down parts of the FCC's media ownership rules, noted that, while using the Department of Justice and Federal Trade Commission's antitrust formula, the Herfindahl-Hirschmann Index ("HHI"), "as [a] starting point for measuring diversity in local markets," the FCC's adaptation of it "to a measure for diversity in local markets," while a novel approach and one that, in theory, accounted for intermodal competitors, failed to assign appropriate market share percentages to different media outlets. *Id.* at 403. The Court remanded the rules to the FCC to strike a proper balance and reevaluate its HHI-type formula. *Id.* at 373.

[126] *See* IIA PHILIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION § 530(a) (Aspen 2d ed. 2002).

Terms like "digital divide" and "duopoly" are often used to describe the current state of the national broadband market.[127] These phrases are generalizations and do not accurately characterize the local conditions of each town or city. However, the presence of two or three broadband providers does not guarantee an efficient and competitive market, nor does the satisfaction of a minority of the population with their broadband connection necessarily mean the entire population is pleased. There must be a balanced analysis of both the supply of and demand for broadband before terms like "digital divide" are applied.

On the supply side, it might be useful to undertake a value analysis for each locality which would compare current offerings in the traditional wireline market on a price per MB/s basis.[128] For instance, a dial-up connection of 54 kB/s offered by AOL retails for around $24 per month.[129] This averages out to over $420 per MB/s. If a customer chooses a cheaper alternative like Net Zero which offers service for $10 per month,[130] the cost per MB/s is still $178.[131] As for DSL, Verizon offers a basic package of 768 kB/s for $15 per month which works out to around $19.50 per MB/S.[132] Verizon's FiOS service, however, promises customers speeds up to 30 MB/s for around $180 per month or $6 per MB/s.[133] Cable modem access via a provider like Time Warner cable, at a speed of 3 MB/s, retails for around $22 per

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[127] *See, e.g.*, MARK COOPER, CONSUMERS UNION, EXPANDING THE DIGITAL DIVIDE & FALLING BEHIND ON BROADBAND: WHY A TELECOMMUNICATIONS POLICY OF NEGLECT IS NOTE BENIGN (2004), http://www.consumersunion.org/pub/ddnewbook.pdf.

[128] *See* Wikipedia, Broadband Internet Access, *supra* note 22.

[129] *See* AOL, Pricing Packages Page, http://site.aol.com/price_plans/index.adp (last visited Oct. 30, 2006).

[130] *See* Net Zero, Price Comparison Page, http://www.netzero.net/signup/comparison.html (last visited Oct. 30, 2006).

[131] A number of ISPs offer services to "boost" dialup speeds. Even if we allow for dialup speeds to top out at 200 kB/s, the speed that divides dialup and broadband (at least according to the FCC), price per MB/s is still well over $100 for AOL and over $50 for Net Zero. For a profile of one company, Artera Turbo, please see Tom Spring, *Boost Dial-Up to Broadband Speeds*, PCWORLD.COM, http://pcworld.about.com/news/Apr182002id94985.htm.

[132] *See* Verizon, Online DSL Packages & Prices, *supra* note 37.

[133] *See* Verizon, FiOS Packages & Prices, http://www22.verizon.com/FiOSForHome/channels/FiOS/root/package.aspx (last visited Oct. 30, 2006).

month which averages out to $7 per MB/s. As this evidences, prices continue to fall as broadband delivery methods continue to innovate.[134]

On the demand side, public involvement is crucial to accurately gauge demand for enhanced services like broadband. An advisory committee might be established to solicit public opinion,[135] or the municipal government might hold public hearings around the city. Whichever way it is done, the public ought to be consulted because they will be the ultimate beneficiaries of, and the primary customer base for, these new services.

C. APPLY PRINCIPLES OF MARKET FAILURE

The idea of market failure is often mentioned in the municipal broadband debate as the counter to those in favor of broad municipal involvement.[136] Yet the term is oftentimes left undefined. It is a powerful and apt idea to apply in this context and a workable framework is necessary to determine what market failure is and when it is present.

In general, market failure refers to the existence of certain market conditions that lessen competition below an efficient level.[137] This might be due to a monopolist charging monopoly prices, or an oligarchy segmenting the market and coordinating efforts, or any number of other factors. For some perspective, consider that "the more nearly perfect a market is, the stronger is the tendency for the same price to be paid for the same thing at the same time in all parts of the market."[138] This means that in a perfectly competitive market goods will never be priced above the cost of production or the amount that consumers who wish to buy it will pay for it. It is rare for any market to be perfectly competitive, especially one where economies of scale are prevalent,[139] as in the market for broadband delivery. Thus,

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[134] *See* GAO Report, *supra* note 90.

[135] For an example, see *infra* for a discussion of New York City and Florida's approach.

[136] *See* FERGUSON, *supra* note 4.

[137] *See, e.g.*, Richard O. Zerbe Jr. & Howard McCurdy, *The End of Market Failure*, REGULATION, Vol. 23, No. 2, http://www.cato.org/pubs/regulation/regv23n2/zerbe.pdf, for a concise definition of the traditional notion of market failure and for a discussion of the evolution of the debate surrounding the efficacy of that notion.

[138] *See* ALFRED MARSHALL, PRINCIPLES OF ECONOMICS 385 (1890).

[139] *See* HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY § 1.1(a) (West 2d ed. 1999).

the market for broadband is vulnerable to the wide spectrum of pressures that competition might induce, including market failure. Alexander Larson and Douglas Mudd have set out four criteria for deciding when there is market failure in the broader telecommunications market.

> Policies designed to enhance competition in a market make sense only if the following conditions hold: (1) prices in that market are too high (due to the possession of market power by the incumbent firm); (2) the competitive interaction between firms resulting from a competition policy would curb that market power; (3) prevailing service quality levels or the number of choices available to consumers are deficient in ways detrimental to consumers; and (4) the direct regulation of retail prices is an ineffective means of correcting this problem.[140]

The first and third criteria mirror the second guiding principle set forth above. As has been noted, prices are important in all markets but with broadband innovation of delivery methods is just as important an indicator of efficiency.[141] Moreover, prices are often a reflection of a market's efficiency. If a market is stagnant, products or services tend to be out-of-date and expensive relative to consumer expectations. In addition, the second criterion adverts to the likelihood that but for the absence of regulations the market would be competitive. This is a difficult axiom to apply to any segment of the wider telecommunications market as the fruits of the "deregulatory" Telecommunications Act of 1996 are still far from being realized, even a decade after being enacted.[142] Finally, the fourth criterion is inapposite in the municipal realm as retail price regulation is forged on the state and federal level. But the overall arc of the conditions is important to understanding market failure.

A broadband market failure would thus necessitate a very specific and narrow set of conditions precedent. A municipality would likely

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[140] *See* Alexander Larson and Douglas Mudd, *The Telecommunications Act of 1996 and Competition Policy: An Economic View in Hindsight*, 4 VA. J.L. & TECH. 1, 3 (1999).

[141] *See* Wu, *supra* note 21.

[142] *See* Speta, *supra* note 45; *cf., e.g.*, Gene Kimmelman, Mark Cooper & Magda Herrera, *The Failure of Competition Under the 1996 Telecommunications Act*, 58 FED. COMM. L. J. 511 (2006).

have to be served by one incumbent provider; the prices for the service would have to be artificially high; supply would fall short of demand or a segmented market would exist where tiered service was available to different consumers at different prices; and, local regulation, to the extent that it is possible, falls short of assuring parity. This type of situation is unlikely to present itself in larger cities, but there might be instances in more rural areas where the incumbent – say, the telephone company – so dominates the broadband market with DSL that there is little choice for the municipality other than to partner with a private provider or set out on its own to build a municipal system. In this case, the last two guiding principles will apply.

D. LEVERAGE EXISTING MUNICIPAL RESOURCES

One of the more powerful tools at the disposal of municipalities is their ability to license public rights-of-way. Municipalities have an absolute monopoly over these rights-of-way but are in no way allowed to allocate or license them in discriminatory ways. On the contrary, a local government is statutorily constrained both on the federal and state level in how it may allocate licenses. However, so long as a municipality allots access to public rights-of-way in a nondiscriminatory way, the municipality has the ability to subtly influence policy by judiciously issuing licenses. This can be done in a number of ways.

A municipality could make a limited number of pole-tops available for licenses in a certain area of the city with strict conditions attached. For example, a municipality might license rights-of-way for wireless broadband access in low-income areas with the condition that the licensee provides discounted access. This is similar to what Philadelphia is doing with Earthlink. Similarly, a municipality could offer all its rights-of-way under a nonexclusive license with the condition that the licensee provides broadband services to every customer in the service area. This might have the effect of lowering the barriers of entry for promising new wireless broadband providers and pitting them head-to-head right out of the gate. Furthermore, municipalities also have franchising power over cable companies. As was discussed above,[143] a cable company must obtain a franchise in order to provide service in a given area. These franchises are licensed for a limited number of years and renewable.[144] This allows a

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[143] *See* 1992 Cable Act, *supra* note 110.

[144] *See* New York City's Department of Information Technology & Telecommunications' Cable Franchising Web Page,

municipality if it deems appropriate, to have regulatory power over the market should a franchisee be derelict in fulfilling its responsibilities set out in the franchise agreement.

Ultimately, a municipality has the power to act strategically in its allotment of licenses and franchises to public rights-of-way. The decisions it makes regarding which parties to contract with will have a substantial effect on the broadband market and could potentially nudge the market in the direction the municipality favors.

E. LEGISLATE AROUND THE MARKET

Another powerful and potentially potent regulatory tool available to a municipality is legislation. But a municipality would be wise to use this otherwise limited power sparingly. First, the possibility exists for overlapping and redundant conditions among similar federal, state, and local laws, that a firm will have to comply with. Such conditions will likely chill investment and innovation and potentially raise prices. Second, regulation by its very nature sets a standard that is oftentimes inflexible, which is not amenable to a market characterized by rapid innovation. One need only to look at the many years of regulatory uncertainty in the immediate aftermath of the 1996 Telecommunications Act to see that micromanagement of a dynamic sector frustrates the market. If a municipality feels obligated to legislate, then it should be deliberate and follow one or both of the following examples.

The first example comes from the municipal level, specifically New York City's Local Law 126 of 2005.[145] New York City's telecommunications and technology marketplace is one of the most diverse and competitive in the country.[146] The Local Law calls for the formation of a broadband advisory committee that will be charged with examining the market and deciding whether or not municipal action is needed. The advisory committee will also be required to hold public hearings in each of the city's boroughs in order "to educate the public on new technologies and policies and to accept public

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http://www.nyc.gov/html/doitt/html/business/business_franchise.shtml (last visited Oct. 30, 2006); *see also*, The Council of the City of New York Authorizing Resolution No. 475, Nov. 17, 1998, *available at* http://www.nyc.gov/html/doitt/downloads/pdf/res475_1998.pdf.

[145] Full text of this law is available online. New York City's Local Law 126 of 2005, Int. No. 625-A, *available at* http://webdocs.nyccouncil.info/textfiles/Int%200625-2005.htm?CFID=1016714&CFTOKEN=96433909 (last visited Oct. 30, 2006).

[146] *See* REPORT, *supra* note 37.

comment."[147] This joint plan of action is a more deliberate and conservative approach than the plans currently in various levels of implementation in large cities such as Philadelphia and San Francisco.

The second example comes from Florida. In 2005, the State Legislature passed SB 1322, which states that a governmental entity proposing to provide communications service must make available to the public a written business plan for the venture and must hold no less than two public hearings (not less than 30 days apart) to consider a number of factors, which include: whether the service is currently provided in the community and whether it is generally available throughout the community; whether a similar service is currently being offered in the community and is generally available throughout the community; and private and public costs and benefits of providing the service by a private entity or a governmental entity, including economic development impacts, tax-base growth, education, and public health.[148]

Each law represents a unique way of approaching the debate. Both rely on public participation in helping to gauge the need for municipal broadband services. If there is sufficient demand, and the local conditions are such that market failure exists, then and only then, will the municipality be allowed to enter the market. These bills represent a good compromise between outright preemption at the state level and unfettered market entrance at the local level.

1. A CAUTIONARY TALE OF GOVERNMENT INTERVENTION

In 2005, the Massachusetts Port Authority ("Massport") sought to enforce a lease provision that would restrict the installation and use of antenna to create Wi-Fi hotspots at Boston-Logan International Airport. Massport's intention was to limit wireless activity to a central antenna it installed and that would be maintained by a third-party vendor. Lessees that wished to provide wireless access in their terminals would have to purchase access from Massport and likely be forced to pass on this fee to customers. Continental Airlines wanted to provide its customers with free wireless access and filed a Petition for a Declaratory Ruling before the FCC seeking to confirm that the

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[147] New York City's Local Law, *supra* note 145, §2 (d).

[148] Full text of this law is available online. S. 1322, 109th Cong. (2005), *available at* http://www.flsenate.gov/cgi-bin/view_page.pl?Tab=session&Submenu=1&FT=D&File=sb1322er.html&Directory=session/2005/Senate/bills/billtext/html/ (last visited Oct. 30, 2006).

restrictions violate federal law.[149] Continental contended that instead of promoting a competitive marketplace for wireless services, Massport granted a monopoly to the service provider of its choice, which had the effect of setting the price for wireless services at the airport.

The actions of Massport are striking for a number of reasons. First, it sought to regulate the deployment and use of unlicensed wireless services within the airport. This is a clear violation of federal law.[150] Second, on any given day, more than 60,000 people pass through Boston-Logan, putting it on par with a medium-sized municipality.[151] Having a monopoly supplier and requiring customers to pay for wireless broadband where such service would otherwise be free would result in substantial consumer welfare losses. Fortunately, the FCC has held in favor of Continental.[152] While this might seem to be an extreme example of municipal intrusion into the broadband market, it serves as evidence of how municipal networks can chill private investment, stifle competition, and consumer benefits when there is an otherwise robust and competitive market.

V. CONCLUSION

This article has sought to accomplish a number of things. First, it strove to come to a workable definition of broadband, not only from a technical perspective but from a market standpoint as well. It is essential to understand what true broadband is and how its market has evolved in order to appreciate the health of this sector within the American economy despite the pessimistic rhetoric that peppers the larger broadband policy debate.

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[149] *See* Petition of Continental Airlines, Inc. for a Declaratory Ruling, FCC ET Docket No. 05-247, filed July 8, 2005.

[150] The FCC has established a clear policy that no user – including a public user – has any priority rights in unlicensed spectrum. *See* Order, Remington Arms Company, *In re* Request for a Waiver of Part 15 Regs., ET Docket No. 05-183, FCC 05-194 ¶10 (Nov. 18, 2005).

[151] The airport is the 19th busiest in the United States, serving over 22 million passengers in 2003. *See* Massport: Boston's Logan Int'l Airport, About Logan, http://www.massport.com/logan/about.asp (last visited Oct. 30, 2006).

[152] *See* Memorandum Opinion and Order, In the Matter of Continental Airlines Petition for Declaratory Ruling Regarding the Over-the-Air Reception Devices (OTARD) Rules, FCC 06-157 (Nov. 1, 2006).

Second, this article examined a number of municipal broadband projects. After analyzing a number of diverse business models, it was found that the public-private partnership is both the most popular and oftentimes more efficient model. In addition, wireless technologies appear to be the dominant trend in municipal broadband projects. Yet, it was also found that broadband transmitted via Wi-Fi is slow and unpredictable. Municipal FTTH projects might eventually be the most effective means of delivering fast connection speeds at cheaper prices, but the massive amounts of initial capital investment that these networks require are often prohibitive. Ultimately, the decision of whether or not a municipality ought to enter the broadband market is best considered on a case-by-case basis based on many factors, including the relative health of the local broadband market.

Third, a number of guiding principles for deciding when there ought to be municipal involvement in broadband deployment were enumerated. A framework incorporating principles of market failure is essential to this analysis as it creates a very narrow set of circumstances whereby a municipality has grounds to enter the market. This conclusion might run counter to the current presumption in favor of municipal involvement but it also cautions against an impetuous entrance. The example of Massport's foray into the local wireless broadband market offered evidence of the chilling effects on innovation and competition that municipal entry will have in the absence of market failure.

The municipal broadband debate has been plagued by hyperbole from all sides of the ideological spectrum. Some bemoan a wayward U.S. broadband policy. Others lavishly praise the status quo and support full-scale preemption, including municipal involvement with evidence of a market failure. This article has sought to rationalize the debate by deriving lessons from a number of municipal broadband initiatives. The only conclusions that can be drawn at this time are that broadband is an important tool that must be made available to all citizens and that municipal involvement in its development is only appropriate in certain limited circumstances. Beyond that, only consumer demand can accurately predict the future of broadband in the United States.